

PERSONAL DATA

Damir Pajić, born on July 6th 1974 in Virovitica (Croatia). Married, father of three children. Croat and Croatian citizen. Military service finished 1999/2000.

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EDUCATION

- 17/3/2008 PhD degree, Faculty of Science, University of Zagreb, thesis: Classical and quantum magnetic relaxation in selected nanomagnets, mentor: prof.dr.sc. Krešo Zadro, doctoral study started 1999/2000
- 1/2/1999 diploma degree, Faculty of Science, University of Zagreb, thesis: Quantum magnetic hysteresis in Mn₁₂-acetate, mentor: doc.dr.sc. Krešo Zadro, study started 1993/1994
- Middle school: 1989-1993 - Gimnasium Petar Preradović, Virovitica (course: mathematics-informatics)
- Primary school: 1981-1989 – Primary school Suhopolje

EMPLOYMENT

- From 1/12/2016: associate professor, Department of Physics, Faculty of Science, University of Zagreb, Bijenička c. 32

Previous employment:

- 1/5/2011-30/11/2016: assistant professor, Department of Physics, Faculty of Science, University of Zagreb, Bijenička c. 32
- 1/5/2008 – 30/4/2011: higher research assistant, Department of Physics, Faculty of Science, University of Zagreb
- 1/5/2000 – 30/4/2008: research assistant, Department of Physics, Faculty of Science, University of Zagreb

STAY AT FOREIGN INSTITUTIONS

- Institute of Mathematics, Physics and Mechanics, Ljubljana, Slovenia, Department of Physics, with Prof.Dr. Zvonko Trontelj, 15/10/2009-14/10/2010 and additionally altogether two months of shorter stays
- Vienna University of Technology, Austria, Institute of Solid State Physics, Laboratory for Mössbauer spectroscopy and magnetic measurements, with Prof. Dr. Michael Reissner and Prof. Dr. Wolfgang Steiner, 1/10/2004 – 1/11/2004 and additionally altogether two months of shorter stays
- Eötvös Loránd University, Budapest, Hungary, Laboratory for X-ray spectroscopy, with Dr. Zoltán Dankházi, 15/11/1998 – 15/12/1998

SCIENTIFIC ACTIVITY AND PUBLICATIONS

The scientific work D.Pajić performs mainly in the area of experimental investigation of magnetic phenomena in the solid state, and investigation of properties of the novel materials mainly of the complex magnetic structure. A large number of these materials and phenomena belong to the hot topics in condensed matter physics.

According to WoS, D.P. is co-author of 94 scientific papers 40 of them being in the last 5 years. According to WoS (24/3/2022) the works are cited 1056 times (879 without self-citations), and reached H-index = 18. Most of publications belong within Q1 category. In addition to these, there are also 12 scientific papers published in journals that are not listed in the WoS. D.P. is the first author on 8 papers (on 5 of them also the corresponding author), and has additional 5 papers as corresponding author. On the multidisciplinary publications the usual order of the authors is synthesis-structure-properties, and in such additional 25 works D.Pajić gave is at the front of the magnetic part. The works

were presented at more than 130 scientific conferences with published abstracts at least. At 26 scientific conferences D.P. presented the works personally, and gave 4 invited talks at international conferences, 4 sectional lectures at national conferences and held 14 posters at international and national scientific meetings, while the other 100+ works were presented by colleagues.

During the work of his doctoral thesis, D.P. and his co-authors published 13 papers, mostly on single-molecule magnets and similar systems, magnetic nanoparticles, and magnetic amorphous alloys. After that, he made a breakthrough in several areas of research, including multiferroic systems, which he began to deal with during his postdoctoral stay in Ljubljana, organic magnetic materials and complex organometallic compounds, oxides of transition metals with complex magnetic orders, metal-organic networks with magnetic order, superconductors doped with nanoparticles, and some exotic nanostructures. Magnetic behaviour in a wide range of temperatures and magnetic fields was mostly investigated, and by using various models, magnetization and its dynamics were related to the structure of the compound and/or the morphology of the sample. The papers show wide interest and expertise and multidisciplinary cooperation, in which the contribution from the field of magnetism is also important. The research of magneto-electric phenomena in multiferroics was also carried out within the very successfully completed Installation Research Project of Croatian Science Foundation (25 papers published until completion, and a few more later), within which the experimental set-up was upgraded and new materials were synthesized, as well as in collaboration with theoretical physicists, the complete investigation of magneto-electric phenomena in novel materials were performed. The successful continuation was also made possible by the cooperation on the new project of the leader Dr. sc. Marijane Jurić from the Institute Ruđer Bošković. A large number of works were also completed in other domestic and international collaborations. Intensive cooperation with Prof. dr.sc. Mirto Rubčić from the Department of Chemistry we intend to continue with a joint application of a competitive scientific project. For the last two years, we have been cooperating within the COST project "Ultrafast opto-magneto-electronics for non-dissipative information technology" and joint results are expected this year as well.

SCIENTIFIC RESEARCH PROJECTS

Leader of the projects:

- 1/6/2015-31/10/2019 Installation research project of the Croatian Scientific Foundation, "Multiferroic and magnetoelectric systems", fund: 130.000 €, CSF+cofunding of Department of Physics
- 2016-2017 together with Dr. sc. Goran Branković, from the Institute for Multidisciplinary research of University in Belgradem bilateral croatian-serbian project "Magneto-electric properties of nanostructured multiferroic ceramics based on oxides of transition metals". fund: 1,500 EUR per year on both sides
- 2012-2014, with Prof. dr. sc. Michael Reissner, Vienna University of Technology, Austria, bilateral croatian-austrian research project "Magnetic properties of ferrite and metal boride nanoparticles", fund: 2.400 € per year on both sides, MSES HR and ÖAD AU
- 2012-2013, with Prof. dr. sc. Zvonko Jagličić, Institute of Mathematics, Physics and Mechanics, Ljubljana, Slovenia, bilateral croatian-slovenian research project "Magnetoelectric properties of PZT-PFW ceramics and transition metal fluorides multiferroics", fund: 1.700 € per year on both sides, MSES HR and ARRS SLO
- 2009-2010, Brain Gain program of Croatian Science Foundation and Slovenian Ad-Futura program, main investigator on the postdoctoral project "Magnetoelectric multiferroics and related materials", main collaborator: Prof.dr.sc. Zvonko Trontelj; fund: 24.000 €

Collaborator at the projects:

- "Topological versatility of oxalate compounds: synthesis, properties and use for oxides", from 2020, supervisor: Ph.D. Marijana Jurić, Ruđer Bošković Institute, fund: ~130.000 EUR, source of funding: HRZZ
- COST action CA-17123 "Ultra-fast opto-magneto-electronics for non-dissipative information

technology" and work on the project within the Ultrafast magnetoelectrics workgroup, since 2019, led by Prof. dr. Andrei Kirilyuk, Radboud University, The Netherlands, funding source: COST@EU

- 2018-2020. "Center for advanced research of complex systems - CeNIKS", infrastructure project of the European Fund for Regional Development, managers Assoc.prof. Mihael Grbić and Associate Prof. Emil Tafra, ~7.8 mil EUR.
- "Nanomagnets", 2007-2014, leader Prof. dr. sc. Krešo Zadro, fund: ~7.000 € per year, MSES HR (considerable contribution)
- "Strengthening the SOLid-state research capacities in Zagreb by the introduction of Nuclear Magnetic Resonance method", 2009-2012, leader Prof. dr. sc. Miroslav Požek, fund: ~800.000€, : FP7, EC (small engagement)
- "Enhancement of electromagnetic properties of MgB₂ superconductor by magnetic nanoparticle doping", 2007-2010, leader Prof. dr. sc. Emil Babić, fund: 183.000 €; Unity Through Knowledge Fund, RH (considerable contribution)
- "Magnetization of quantum magnets at ultra low temperature", 2009-2011, leader: Dr. sc. Ivica Živković, fund: 35,000 EUR; Unity Through Knowledge Fund, RH (partial contribution and small engagement)
- "Molecular magnets", 2002-2006, leader Prof. dr. sc. Krešo Zadro, fund: ~50.000 €; MSES RH; "Electric and magnetic properties of selected materials", 2000-2002, leader: Prof. dr. sc. Emil Babić, fund: ~100.000 €; MSES HR (considerable contribution)

TEACHING AT UNIVERSITY

As associate professor at Department of Physics gave the lectures and was leading the exercises:

- From 2016/2017 till 2021/2022 Physics of materials, held a total of 180 hours of lectures.
- From 2016/2017 till 2021/2022 Physics of nanomaterials, lectures and seminars, held a total of 150 hours of lectures and 75 seminars, plus some consultations with an Erasmus student on that subject in 2019/2020.
- From 2016/2017 till 2021/2022 Introductory Physics Laboratory 1 and Introductory Physics Laboratory 2, giving introductory lectures and instructions in each semester, a total of 45 hours, plus organizational duties.
- From 2016/2017 till 2021/2022 Physics Laboratory Exercises for chemists, giving introductory lectures and instructions, a total of 25 hours, plus organizational duties.
- In 2021, held 2 hours of lectures at the Doctoral course in physics (solid state)

As assistant professor at Department of Physics gave the lectures and was leading the groups:

- From 2010/2011 till 2014/2015 Physics of Materials, gave lectures (in 2013/14 seminars, too), altogether 150 hours of lectures and 15 hours of seminars. In 2015/2016 it will be 30 hours of lectures.
- From 2012/2013 till 2014/2015 Physics of Nanomaterials, lectures and seminars, gave altogether 90 hours of lectures and 45 hours of seminars. In 2015/2016 it will be 30 hours of lectures and 15 hours of seminars.
- From 2011/2012 till 2014/2015 Introductory Physics Laboratory 1 and Introductory Physics Laboratory 2, organisation of the whole subject and leading of one group of students every semester, altogether 480 hours. In 2015/2016 it will be 60 hours of working with groups and additional organisational activities as a leader of subject.
- From 2010/2011 till 2014/2015 Physics Laboratory for Chemistry Students, organisation of the whole subject and leading of one group of students every semester, altogether 300 hours. In 2015/2016 it will be 60 hours of working with groups and additional organisational activities as a leader of subject.

As assistant gave:

- 2008 Laboratory in Statistics and Measurements, 30 hours
- 2008 Introductory Physics Laboratory 1, 60 hours
- 2000-2009 Physics 1 and 2 for chemistry students, auditory exercises, 600 hours
- 2000-2003 i 2008, Experimental techniques in physics, seminars, 20 hours
- 1998-2004, Physics Laboratory 3, 4, 5, altogether around 900 hours

Altogether this is 690 hours of lectures, 170 hours of seminars, 600 hours of auditory exercises and 1900 hours of laboratory exercises, that is amount of 4075 norm-hours.

Last 5 years, as an associate professor, from this amount gave 390 hours of lectures, 75 hours of seminars and 70 hours of laboratory exercises, that is amount of 887.5 norm-hours plus leading of three subjects of laboratory physics exercises. That number should be reduced by 50 norm-hours given by colleagues during the two longer rehabilitation times.

Contribution of D.P. in advancement of given subjects:

Subject Physics of Materials is updated with some newer topics and the matter supplemented so that each section refers to the very concrete and novel materials related to the discussed phenomena, thus highlighting the constant development, and showing the prospects for discoveries. The presentations are updated permanently to include all parts of the matter, that can be used for repetition and as instructions for reading of the prescribed textbooks. In cooperation with the assistants, we covered the essential computational things useful for later studies and completion of the matter, and also included an overview of tools for visualizing the structure of materials in which we teach students. Lecture presentations that are used for repetition and as reference for the literature, but not intended to be sufficient for learning, are available at http://www.phy.pmf.unizg.hr/~dpajic/nastava_mater.html

Subject Physics of Nanomaterials is considerably upgraded with new content, which now in addition to matter related mainly to structural characteristics, contains in the same extent other phenomena in nanomaterials, including the transport of electricity and heat, magnetic, electrical, optical, biological, and phenomena associated with some modern nanoscopic devices, accompanied also by the extension of literature. Seminars are also selected to reflect the recent research results in field of the nanomaterials during last few years, covering the broadest possible representation of different areas of condensed matter physics. From the students is required the literature search and scientific type of reporting. Lecture presentations that are used for repetition and as a reference for the literature, but not intended to be sufficient for learning, are available at http://www.phy.pmf.unizg.hr/~dpajic/nastava_nanomater.html

Intention for future learning activities:

In addition to the material provided in the Physics of Materials course, very specific new materials related to the covered phenomena are appropriately mentioned and presented, so that constant development is highlighted, and perspectives for new knowledge are seen. The presentations have been supplemented so that they contain all parts of the covered matter, and can be used for repetition and guidance through the reading of prescribed textbooks. In cooperation with the assistants, we also covered important computational matters useful for later study, and also included more modern tools for visualizing the structure of the material, which we also teach students. Lecture presentations that are used for repetition and as reference for the literature, but not intended to be sufficient for learning, are available at http://www.phy.pmf.unizg.hr/~dpajic/nastava_mater.html

The Physics of Nanomaterials course was upgraded with new literature, so now it forms a whole that consists of structural characteristics, electrical and thermal transport, magnetic, electrical, optical, biological phenomena, and phenomena related to some more modern nanoscopic devices. The seminars have also been chosen to present the latest results of research in the field of nanomaterials in the last few years, making sure that the topics are as widely represented as possible covering different areas of condensed matter physics, where the student is required to research the literature and do a

scientific type of reporting. Lecture presentations that are used for repetition and as a reference for the literature, but not intended to be sufficient for learning, are available at http://www.phy.pmf.unizg.hr/~dpajic/nastava_nanomater.html

MENTORSHIP OF DOCTORAL STUDENTS

- Pavla Šenjug, mag.phys. employed since June 1, 2017 at the Department of Physics, mentor for work "Magnetic orders and magnetoelectric effect in selected multiferroic metal-organic copper perovskites". So far, we are co-authors on 3 published scientific papers (P. Šenjug is the first author on 2). She submitted her doctoral thesis to the Department Council for evaluation.
- Dario Barišić, mag.phys. Employed since April 1, 2019. at the Department of Physics, D.P. is an institutional mentor. So far, we are co-authors on 3 published scientific papers.

MENTORSHIP OF DIPLOMA WORKS AND SEMINAR WORKS, AND WORK WITH DOCTORAL AND POSTDOCTORAL STUDENTS

- 2012-2015 mentor of 11 students for their diploma work, and co-mentor of 4 students who partially performed investigation in our laboratory, and in 2022 mentorship is planned with 1 student. Of these, 6 students defended their diplomas after the previous election at associate professor position, and with 2 graduates (Jure Dragović and Matija Kalanj) published scientific papers as co-authors after.
- Mentor of students who received Rector's award for the best student work: Lovro Vrček 2018, Toni Mrković 2016, Jure Dragović 2015,
- 2005-2015 mentor of students for seminar works performed in the Laboratory for electric and magnetic phenomena with 9 undergraduate students and 10 doctoral students
- 2012-2018 collaborated and helped during the research for the doctoral thesis of Filip Torić (mentor Prof. Krešo Zadro, topic: connection between crystal structure and magnetic behavior of selected complex compounds), which resulted in the publication of 5 papers in CC-journals related to the doctoral thesis, and the collaboration continued for some time and further up to the current 12 co-authored publications in CC-journals
- 2006-2012 collaborated and helped in research for doctoral work of Nikolina Novosel (mentors Prof. Krešo Zadro and Prof. Emeritus Emil Babić, topic: enhancement of superconducting properties of MgB₂ doped with magnetic nanoparticles), which resulted with 7 publications in CC-journals and several conference papers, and collaboration is continued
- 2008-2009 collaborated in postdoctoral research of Dr. A.T. Raghavender at Department of Physics (stipend of Croatian Science Foundation, main collaborator Prof.dr.sc. Krešo Zadro), which resulted with 4 scientific publications about magnetic nanoparticles and several conference contributions
- 2001-2008 collaborated and helped 4 students (Dijana Žilić, Johannes Beiter, Nikolina Novosel, Tomislav Mileković) during their investigation for diploma work (mentorship of Prof. Krešo Zadro) and with every of them co-author of published paper in CC-journals from topic of their diploma works.

PROFESSIONAL ACTIVITIES

- Refereeing for scientific journals Journal of Physics: Condensed Matter, Journal of Physics D: Applied Physics, Applied Surface Science, Journal of Alloys and Compounds, Materials Research Bulletin, Journal of Physical Chemistry, European Physical Journal Plus, Scientific Reports, Materials Research Express, Materials Letters, Journal of Materials Engineering and Performance, International Journal of Thermophysics, Processing and Application of Ceramics, Prolegomena, Interdisciplinary Description of Complex Systems, and domestic journal Nova prisutnost.
- Reviewed reports of research projects for Croatian Science Foundation

- Organisation committee of the international scientific meetings:
 - Head of the local organizing committee and member of the program committee of the international scientific meeting 3rd Summer School: "Ultrafast magneto-electrics" as part of the COST activity MAGNETOFON, Samobor, 5-8. X. 2021. More information at: <http://www.phy.pmf.unizg.hr/~magnetofon/>
 - The organizing committee of the Solid State Science & Research 2021 and 2019 international meetings, while 2017 was classified as domestic, Zagreb, participants always over 100, more information at <https://scires2021.irb.hr/>
 - 21st International Scientific Meeting on Vacuum Science and Techniques, Samobor, 8-9/V/2014, local organizing committee, ~50 participants
 - International workshop "Describing Complex Systems", Zagreb/Croatia, 2005, local organizing committee, ~80 participants
 - 15th International Conference of Physics Students ICPS2000, Zadar/Croatia, 2000, scientific part of organizing committee, >300 participants.
- 2013 – 2015 leader of the Summer-School of Young Physicists of Croatian Physical Society (ljskola.hfd.hr)
- 2000 – 2015 member of the State Committee for Competitions in Physics, as an author of theoretical tasks and reviewer.
- 2010 member of the Academic Committee of the 41st International Physics Olympiad held in Zagreb/Croatia.
- From 2003 member of the Editorial board of the international scientific journal Interdisciplinary Description of Complex Systems.
- In 2021, editor of a special issue of Materials magazine entitled Magnetic, Electrical and Structural Phenomena in Multifunctional Metal Oxides – Novel Insights https://www.mdpi.com/journal/materials/special_issues/multifunct_met_oxides_nov_insights
- Wrote dozens of newspaper articles on science.
- In 2014 member of the School Board in Primary school Mihael Šilobod in Sv. Martin pod Okićem
- Reviewed physics textbooks for elementary school for the needs of the Ministry of Science and Education
- Professional editing of the book Javorski and Detlaf: Handbook of physics, Tehnička knjiga, Zagreb 2008.

DUTIES IN THE INSTITUTION

- From 2020, head of the Laboratory for the Research of Magnetic and Electric Phenomena
- 2016-2018. Deputy Head of the Institute of Experimental Physics at our department
- 2016-2017. member of the Quality Management Committee of the Faculty of Science
- 2016-2017. head of the Center for Technical Support at the Department
- 2013-2016. co-leader of the Physics Department Seminar.

DUTIES IN INTERNATIONAL ORGANIZATIONS AND PROJECTS

- Since 2019, member of the General Committee of the European Magnetism Association
- 2019-2021. Member of the Management committee, as deputy for Croatia, in CA-17123 COST activity MAGNETOFON

RECOGNITIONS AND AWARDS

- 2021 Plaque of City of Samobor for contribution to local community
- 2007 Yearly award of the Society of University Teachers and other Scientists in Zagreb to the young scientists and artists for the published work D. Pajić, K. Zadro, R. Ristić, I. Živković, Ž. Skoko, E. Babić, Thermal relaxation of magnetic clusters in amorphous Hf₅₇Fe₄₃ alloy, J. Phys.: Condensed Matter **19** (2007) 296207

- 1996/97 Award to the best student of physics in academic year
- 1995/96 Rector's award for the student work "Magnetization Processes in Fe_{77.5}B_{22.5} Amorphous Alloy", authors Marko Kolanović and Damir Pajić
- 1993 Recognition for the outstanding achievements on 24th International Physics Olympiad (Williamsburg, USA, 1993) and Participation in 23rd International Physics Olympiad (Helsinki, Finland, 1992)
- 2nd award on the State competition in physics in 1991/92 and 3rd award in 1992/93, and 2nd award on State competition in chemistry in 1991/92

MEMBERSHIPS

- Croatian Physical Society
- 2013-2014, member of Management Committee of the Croatian Physical Society

FOREIGN LANGUAGES

- English (approximative grades, max. is 5: reading 5, writing 4, talking 4)
- German (approximative grades, max. is 5: reading 4, writing 3, talking 2)
- Slovene (approximative grades, max. is 5: reading 4, writing 2, talking 2)

INTENTION OF FURTHER ACTIVITY

(The intentions of further activity in the teaching are listed in teaching activities section.)

My scientific research will continue to be focused on metal-organic complex compounds including coordination polymers and networks with magnetic ordering of 0,1,2,3 D character, transition metal oxides with complex magnetic ordering, multiferroic systems, complex amorphous systems, and nanomaterials and superconductors. In addition to static magnetization in a wide range of fields and temperatures, where the use of measurements even at high temperatures well above room and alternating magnetic susceptibility proved to be particularly significant, measurements of magneto-electric properties and electrical polarization were established within the HRZZ establishment project, with the aim of studying magnetic and electrical phenomenon in applied magnetic and electric fields in new synthesized materials. The new equipment in the Laboratory for the Research of Magnetic and Electric Phenomena acquired within the CeNIKS infrastructural project will significantly improve the measurement possibilities, and will also enable the expansion of research using additional parameters when measuring magnetization, such as pressure and light. The focus will be on the design of new materials and research on the mechanisms of magnetic and polar ordering and magneto-electric bonding and other multifunctional phenomena, such as photo-magnetic, on a wide set of materials, which mostly include metal-organic compounds in various forms/geometries/topologies, and mixed metal oxides. Great progress is expected here, because in addition to the built-up equipment for comprehensive research of such systems, close cooperation has been established with groups of chemists from the Chemistry Department of the Faculty of Science (led by Prof. Mirta Rubčić, Ph.D.) and the Ruđer Bošković Institute (led by Ph.D. Marijana Jurić) who work on the design and synthesis of such systems, and we also cover the structural and morphological characterization of the synthesized new compounds. In addition, theoreticians who use ab-initio calculations to solve the synthesized and measured compounds are also involved in the research, and we will especially try to coordinate the cooperation. In addition to domestic chemists, I would also encourage the expansion of cooperation with scientists from the Jožef Stefan Institute in Ljubljana, the Technical Faculty in Novi Sad, the University of Saint Cyril and Methodius in Skopje, the Institute for Multidisciplinary Research in Belgrade, and especially with interested collaborators from the COST project MAGNETOFON: Ultrafast opto-magneto-electronics for non-dissipative information technology, with the aim of comprehensive complementary research for a more complete understanding of opto-electro-

magnetic phenomena in new materials. In order to expand the research with other techniques, I will continue and strengthen cooperation with scientists from Central and Western Europe.

In the near future, I intend to submit a proposal for a research project to a domestic call and prepare for a European call, and based on previous experience and knowledge to propose further research into the electrical and magnetic properties of multifunctional materials under the influence of, for example, pressure and light and other parameters, whose behavior is not yet completely explained and more complete theoretical models are often missing. Therefore, complete experimental research is necessary, for which we have acquired extensive expertise and acquired competitive equipment. I intend to apply for other smaller projects to ensure continuity of research.

I intend to guide doctoral students with the goal of producing a quality dissertation based on a comprehensive investigation of magnetic and electrical phenomena in a group of new materials that will result in significant scientific publications. In addition to doctoral students, the work in the laboratory will also include students who will gradually learn about different techniques and research different systems, and acquire additional skills and knowledge useful for a future career, and thus possibly be motivated to stay working here.

As the head of the Laboratory for the Research of Magnetic and Electric Phenomena, I would take care of the sustainable financing of its work and its availability to interested researchers while covering minimal work costs, and I would also work on promotion for users outside our institution, which would lead to additional funding of the laboratory's work. I would also consider, in case of benefits for the laboratory, to include it in the European Magnetometry.eu network, which would contribute to additional international visibility of the laboratory, useful for continued work. In addition to taking care of the laboratory, I would also be involved in the development of experimental solid state physics at the Department of Physics through joint research projects, and the development of international recognition, as well as cooperation with other faculties in Croatia.

In professional activities, I would return to work with students from schools and cooperation with teachers, as well as organizational work, because physics can be a good cohesive force in our society as well.